REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 1-6 and 8-9 are in the application of which claim 6 has been withdrawn subject to rejoinder with the product claims once the product claims are allowed or allowable.

Claim 7, directed to non-elected subject matter, has been canceled. Two new claims have been added. New independent claim 8 is directed to a catalyst for decomposition of hydrocarbons in a manner similar to claim 1 but also includes the requirement that the core or central portion of the porous oxide particles are substantially devoid of nickel in accordance with the discussion on page 9, last paragraph of the description. The claim also includes a performance requirement adapted from claim 7. The catalyst of the present invention are especially adapted for decomposing hydrocarbons and are capable of maintaining methane conversion of at least 90% under certain reaction and reagent and speed parameters. This is discussed in the paragraph bridging pages 6 and 7 of the description and also in more detail on page 19, last paragraph continuing onto page 20.

Claims 2 and 4 have been amended to attend to the formalities objections noted by the examiner in item 3 of the Official Action.

The new and amended claims presented above are based upon originally disclosed subject matter and do not include new matter. These claims are believed to be in proper order and compliant with 35 USC §112, second paragraph as well as being directed to elected subject matter (with the exception of claim 6 which remains in the case for possible rejoinder). Favorable consideration of the claims is requested.

The sole rejection raised in the outstanding Official Action is directed to claims 1-5, the examiner urging that the subject matter of these claims at the time of review is suggested by the disclosures of European patent 0 624 397. In item 5 of the Official Action the examiner sets out various passages of the cited and applied reference and how they relate to the claims, especially claim 1. As acknowledged in item 5, third paragraph, this reference does not disclose or describe important features of the claims now under review. They include (1) an average particle diameter of 1 to 10 nm and (2) a molar ration of Ni to the sum of magnesium, nickel and aluminum and a ratio of 0.001:0.12, (3) a molar ratio of Mg to Al of between 4:1 to 1.5:1, and finally a specific surface area (BET) of 20 to 400 m^2/g.

In their specification applicants go to great length to explain the importance of these four characteristics taken together with the other aspects of the claims. For instance, applicants have found that it is important to maintain as small a particle size of the metallic nickel particles as possible and certainly not more than 10 nm and thereby the nickel content of the catalyst may be reduced; *see* the discussion on page 6 next to the last paragraph. Applicants also point out that nickel is not present in the central portion of the porous oxide particles and this feature is included in new claim 8.

Also important is the molar ratio of nickel to the total of magnesium, nickel and aluminum as they have found when the molar ratio is more than 0.12 the average particle diameter of the fine metallic nickel particle exceeds 10 nm, thus the inter-relationship between molar ratio and average particle diameter. Further, particles in excess of 10 nm and average diameter tend to deteriorate the anti-coking (carbonizing) property of the catalysts; *see* also the discussion in the middle of page 14 of the description. The molar ratio of Mg:Al (item 3, above) is also important. Applicants have found when the molar ratio of magnesium to aluminum exceeds the indicated range it may be difficult to obtain molded catalyst particles having sufficient strength for convenient and efficient use. In the other direction, when the molar ratio of magnesium to aluminum is less than the specified range the resultant catalyst may not exhibit properties required as a porous carrier; *see* the discussion in the first full paragraph on page 11 of the description.

Specific surface area is also another important consideration, item 4 above. This is because applicants have found that when the surface area value is less than 20 methane conversion tends to deteriorate at high space velocity operation and when the surface area value is more than 400 it is difficult to produce on industrial scale the composite hydroxide as a precursor of the catalyst.

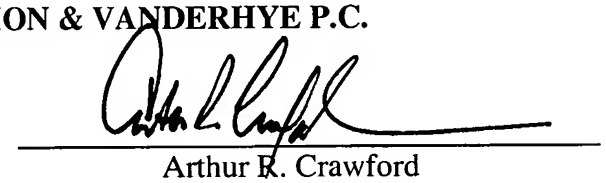
Applicants' specification also includes reference and comparative examples along side examples according to the invention and report data with respect to change in methane conversion as a percentage at various reaction temperatures operating at two space velocities, Table 1 at 2,500 h^{-1} and Table 2 with a similar range of reaction temperatures operating the space velocity of 10,000 h^{-1}.

Applicants have carefully studied variations and parameters of their disclosed and claimed catalyst compositions, however the Official Action really does not take into account the importance of these parameters instead, an argument is put forward that it would be obvious to "optimize" concentrations of various components and other conditions. In point of fact the rejection does not take into account the important values of particle diameter, molar ratio of nickel to Mg, Ni + Al, with the molar ratio of magnesium to aluminum or the specific surface area, all features thoroughly discussed and illustrated in the description of the invention and featured in applicants' claims yet none of which are disclosed in the applied reference. Moreover, applicants have set out reasons why these parameters are important to obtaining an overall successful result and therefore should not be cast aside or trivialized as being insignificant values and findings.

For these reasons the rejection directed to original claims 1-5 and to the extent the examiner may think pertinent to new claims 8 and 9 should be withdrawn because it does not meet all of the claim features of the subject matter defined in the claims. Reconsideration and allowance are solicited.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: 

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